SAGER®
Emergency Traction Splints

Instructor's Manual

The science of traction splinting™

easy on you, easy on your patient

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Additional Handouts

Handouts:
User's Handbook, Why Traction,
Traction Force Challenge,

Emergency Orthopedics: The Extremities,
Important Economical Considerations,
These Are The Facts,
USA ICD9 Projections,
Suggested Reading,
Overhead Projections

For more information on Sager Emergency Traction Splints,
visit our world wide web site at: **www.sagersplints.com**

Minto Research & Development, Inc.: Manufacturer's of Sager®
Emergency Traction Splints and other quality medical products.

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Section **One:**
Instruction guidelines

The following lecture guidelines were developed to assist ALS and BLS Instructors in their endeavor to introduce Sager Emergency Traction Splints to students participating in EMT and Nursing/Paramedic programs. These guidelines are only intended for use as a basic reference tool. Please defer to federal, state, and local medical protocol for definitive analysis and guidelines.

Introduction To Sager Emergency Traction Splints:

Introduce the (S304) Super Sager Form III Bilateral, the S301 Form III Single and the(S300) Sager Infant Bilateral Emergency Traction Splints to the class using your training samples.

Have the class review the training video "The Science Of Traction Splinting™ — Application Guidelines for Super Sager models S304 Form III Bilateral, S301 Form III Single and S300 Infant Bilateral".

Provide handouts of:

1. Sager Form III User's Handbook (models S304,S301, & S300)
2. Why Traction (Reprint from JEMS)
3. Traction Force Challenge (Reprint from EMS Magazine)
4. Emergency Orthopedics: The Extremities (Reprint)
5. Important Economical Considerations
6. These Are The Facts
7. USA ICD9 Projections (1997)

- Demonstrate the application of the S304 and/or S301 on a volunteer from the class. If available, demonstrate the application of the S300 on a pediatric volunteer or mannequin.
- Have each class member practice with the splint(s) until they demonstrate to you that they have mastered its use in accordance with the application instructions.
- Ask if there are any questions regarding the use of Sager Splints and address these in accordance with the provided instructional materials (and state/local medical protocol). If you are unsure of the answer to a question record it and contact your local or state education service for the answer.
- Split the class into three equal groups. Have one group write the written test, one group practice with the splint(s) and one group take the practical test. Rotate through the groups until each student has (1) practiced with the splint, (2) demonstrated they can apply it correctly, and (3) taken the written exam.
- Mark the written exam. Students who fail the written exam should review the material and retake the exam.

Trials using a Sager Splint in practice situations should be undertaken with the "patient" wearing loose shorts and jeans so that natural genital mobility can take place.

A practical exam has been provided for your convenience.

Demonstrate the correct application of Sager Splints — 1 person application in under 2 minutes!

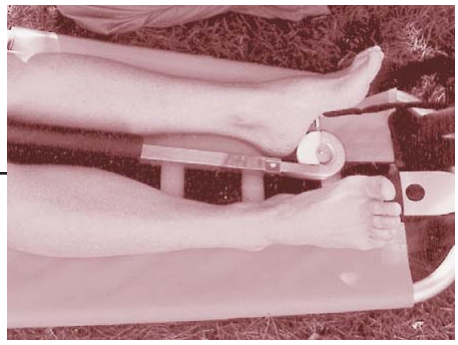
Model S301, Super Sager Form III Single Button Latch Operation.

Application of Model S301, Super Sager Form III Single Leg Traction Splint is similar to that of its bilateral cousin — Model S304. However, the unilateral nature of the S301 requires that when positioning the Splint, the Traction (Pulley) Wheel be placed on it's side and towards the injured limb. To accomplish this, the S301 Outer Shaft must be disconnected from the Articulating Base and Cushion. Simply press the Button Release Latch and rotate the Splint until the Traction Cable is on the same side as the fractured Femur. Reconnect the Outer Shaft to the Articulating Base and Cushion. Follow the easy application stages of "Position, Set and Secure" to complete the operation.

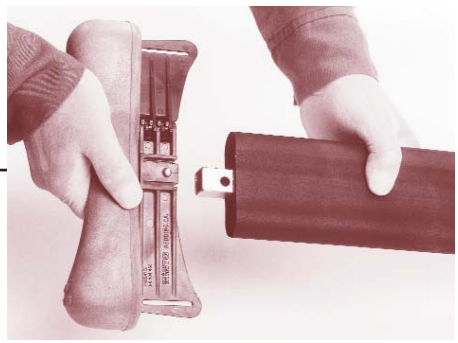
Release Rotate Reconnect

1. Press Button Release Latch

2. Rotate splint so that the Traction (Pulley) Wheel is on the same side as the injured limb.



3. Reconnect the Outer Shaft to the Articulating Base and Cushion.



Students take note:

During operation of the Sager Splint, always pull the cable parallel to the shaft of the Splint. To avoid damage to the cable — do not dangle the Splint by the Malleolar Harness (ankle harness). Do not let the cable "snap" back to the zero position.

Section Two:
Anatomy and physiology

Photograph of accident victim with intact left leg and fractured right femur. Note leg shortening and enlargement of right thigh.

The human Pelvis is a closed bony ring that is strong and massively constructed. It is the foundation for the Torso and provides support for the lower limb attachment and locomotion. It is shaped so that the Ischial Tuberosity forms a platform for sitting in an upright position. This occurs because the Ischial Tuberosity is the most distal part of the pelvis. When the legs are flexed anteriorly, all the weight of the body can rest unencumbered on the Ischial Tuberosities.

see overhead projection # 1

Each Tuberosity is medial to the shaft of the Femur, and is located half the distance between the midline Symphysis Pubis and the Femoral Shaft. They form the base-line of the Uro-genital triangle which slopes anterior and cephelad. The external Genitalia in both sexes are attached at the apex of the Uro-genital triangle, and because of this both sexes can sit straddling seats and saddles without discomfort or injury.

The largest muscle mass in the human body is located surrounding the length of the Femur. When fracture of the Femur occurs, it can result in:

- Laceration of arteries, veins and nerves at the site of the fracture.
- Severe muscle spasms resulting in Bone fragment overriding, deformity and shortening of the limb.
- Decreased tissue pressure — resulting in further bleeding and shock, as well as severe pain.

In addition, spasm of the Psoas and Piriformis Muscles acting on the Proximal fragment of the Femur may cause a flexion, abduction and external rotation deformity.

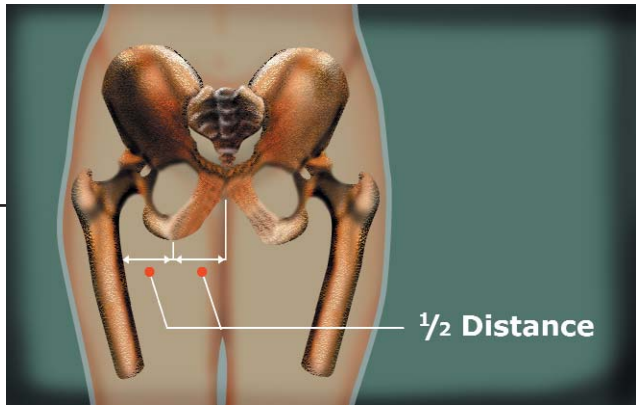


fig 1

Skeletal relationship between the Pelvis and Femur in AP position. Note that the Ischial Tuberosity is half the distance from mid-line to Femur.

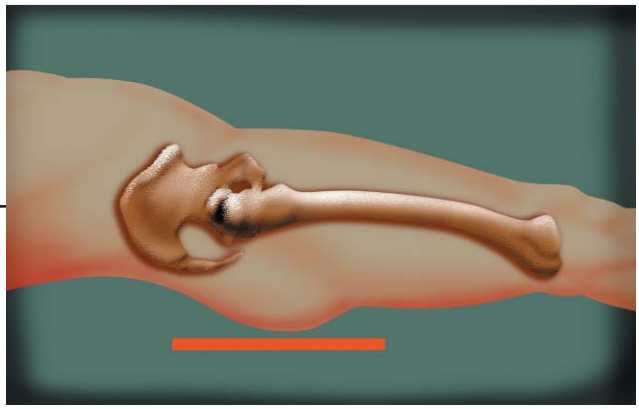


fig 2

Ischial Tuberosity and Femur are on the same plane. Note how the Ischial Tuberosity protrudes no more than 1-2 cm.

Application of Traction

Application of traction breaks the spasm and eliminates much of the pain. It also causes alignment of the bone fragments and subsequent increased tissue pressure. This reduces and controls bleeding and shock, and prevents further nerve, vascular and tissue damage. It is clear that properly applied traction and immobilization of a fractured Femur helps control shock and reduces mortality.

The traction needed to break the spasm of muscles associated with a fractured Femur is a product of the traction force and the length of time it is applied. A very large traction force only needs to be applied a short while for muscle fatigue and relaxation of the spasm to occur. Large traction forces, generally in excess of 30 to 50 pounds can in some cases control spasm in a few seconds. However, there is a risk with this mode of traction. It may result in nerve, vascular, muscle and soft tissue injury, as well as over-extension of bone fragments. Gentle traction, "... the amount of pull required to accomplish this (traction) will vary but rarely exceed 15 pounds. This is gentle traction, and the least amount of force necessary is the amount that should be employed" (American Academy of Orthopedic Surgeons, Emergency Care and Transport of the Sick and Injured, Third Edition, George Banta Co., Inc., 1981, San Antonio, TX, pg.:142)

Skeletal Comparisons Between Sager And Hare

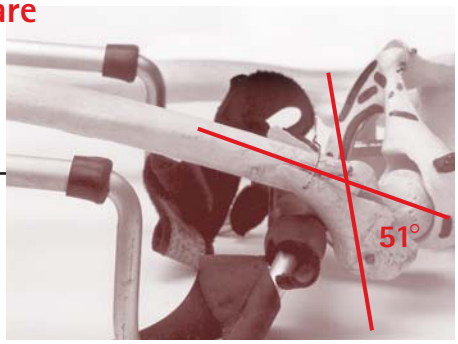


fig 3

Hare Ischial Pad Splint. Angle of malalignment is 51 degrees.

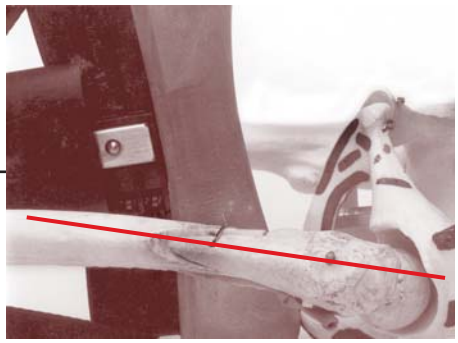


fig 4

Sager Emergency Traction Splints provide near perfect alignment.

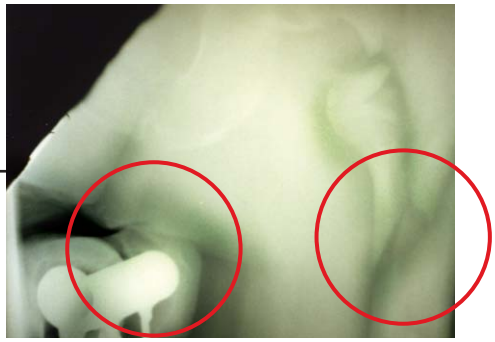


fig 5

Typical x-ray radiograph of fractured femur with Sager Traction alignment – traction force 12 lbs.

Safe Traction

Safe traction for field use should be traction in a known amount prescribed by protocol or a medical consultant. It should also be traction that is dynamic in nature using a resilient member that permits graded reduction of traction force as the muscle spasm decreases and leg length increases. It should avoid the pitfalls of rope, weight and pulley traction — which is a constant and unrelenting force that can result in over-extension of the bone elements. This method is more conducive to a hospital environment where it can be monitored at length, under the care and supervision of an Orthopedic or other Medical Consultant.

Static traction, as provided by drum and crank arrangements should also be avoided. The traction is not quantifiable and, most importantly, can be completely lost if leg spasm stops and the limb lengthens. This traction force exists only for a set length between points of traction and countertraction. It also necessitates constant monitoring and resetting of traction — leading to further distraction of bone elements, and/or needless increase in pain. In addition, uneven forces in lifting and carrying, or simply moving a patient can double or triple the forces against the injured limb. This drawback is commonly associated with most Ischial Pad splints that promote the use of static traction arrangements.

Common Femoral Fractures Versus Splinting Systems

In 1997, the projected potential of U.S. Femoral Fracture hospital admissions totaled 474,551 (USA ICD9 Projections, Internet). Of these, Proximal Third Fractures accounted for 84% or 399,484 of total hospital admissions, while Mid Shaft Fractures accounted for 9% or 41,012 of all admissions. Together, these two fracture types amounted to an estimated 93% of all hospital admissions. The remaining 7% (34,055) of fracture types indicates traction not needed or contraindicated.

Sager Emergency Traction Splints are indicated for treatment in all Proximal Third and Mid Shaft Fractures. In other words in 1997 alone, Sager Splints had the capability and potential to treat 93% of all projected Femoral Fractures. Conversely, Ischial Pad splints are contraindicated in the treatment of Proximal Third Fractures, and thus are only indicated for treatment of Mid Shaft Fractures (roughly 9% of all Femoral Fractures).

A major concern relating to Proximal Third Femoral Fractures is the proximity of the Sciatic Nerve. The Sciatic Nerve exits the Pelvis behind the Femoral Head and lies along the Postero-Medial edge of the Shaft of the Femur. Improper traction splinting of Proximal Third Fractures may result in unnecessary nerve injury. These concerns do not apply to Sager Splints because of the unique design of the Ischial Perineal Cushion.

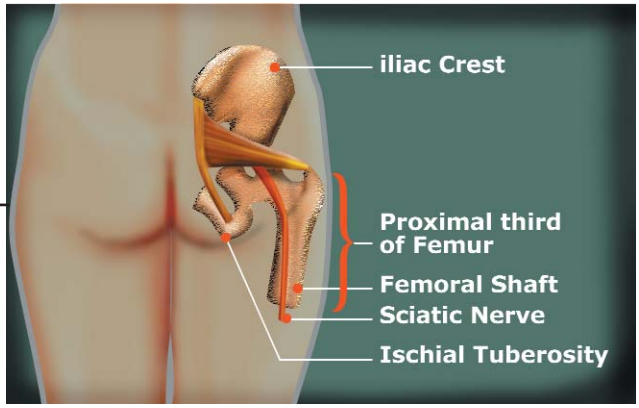


fig 6

Pelvis, Femur And The Sciatic Nerve
(Overhead Projection #2)

continued overleaf...

Consider the anatomy of the Pelvis and Femur. In an AP view, the Ischial Tuberosity is located about ½ the distance from the mid-line to the Femur. In a lateral view, the Ischial Tuberosity's lower edge is no more than ½″ to 1″ below the Shaft of the Femur.

A true Thomas Full Ring or Half Ring Splint, properly sized, can reach up to press against the Ischial Tuberosity medial to the Shaft of the Femur while the bottom of the ring is well below the lower edge of the Femoral Shaft. Ischial Pad splints, although often referred to as half ring splints, are not true half ring splints. Ischial Pad splints are really only a slightly dished padded bar at right angles to the Femoral Shaft of the Femur. The bars/pads are usually elevated on pedestals that can range in height from 1¾″ to 3½″ high (the same adult elevations are seen in pediatric models — sadly they have not been resized for pediatric patients). In order to hook onto the Ischial Tuberosity and provide countertraction, these bars/pads must push up on the Femoral Shaft resulting in a undesirable malalignment of the injured Limb. This malalignment is exaggerated in pediatric patients!

Conversely, Sager's Ischial Perineal Cushion was designed to impinge on the Ischial Tuberosity medial to the Shaft of the Femur and thus provide the same action as a Thomas Full Ring Splint. By design, the Sager is anatomically and medically engineered to avoid pressure against the Proximal Third of the Femur and the Sciatic Nerve.

Currently, revised Ischial Pad splints are also offered on the market. These devices are actually Ischial Pad splints turned on their sides. While the devices attempt to imitate Sager Splints they fall short on a number of critical points. For example, the perineal cushion does not conform to the Perineum, and as well, the device is still subject to the pitfalls of static traction as it continues to promote the use of drum and crank (static) traction arrangements. As importantly, the device is unable to replicate the function and performance of Sager's anatomically correct Ischial Perineal Cushion.

fig 7

Adult and Pediatric Ischial Pad Splints — side by side.
Note how the ischial pads are the same height.

Summary

Sager Emergency Traction Splints are the most anatomically correct traction splints available on the world market today. They apply countertraction against the Ischial Tuberosity medial to the Shaft of the Femur in a manner consistent with the original Thomas Full and Half Ring Splints. This is the same manner of traction and countertraction applied to patients in operating room theatres undergoing surgical reductions and splinting. As with surgical procedures, Sager's application of traction avoids point pressure on the Sciatic Nerve and related vascular structures — in the critical Proximal Third of a Femoral Fracture. This same feature makes the Sager indicated for treatment in 93% of all Femoral fractures!

Sager Splints also avoid the pitfalls of rope, weight and pulley traction, as well as the hazards associated with drum and crank arrangements. They provide "gentle" quantifiable traction that is dynamic in nature. As such, the Sager's revolutionary design permits graded reduction of the traction force as the muscle spasm decreases and the leg length increases. The "Quantifiable" feature enables First Responders (for the first time ever) to document the traction force applied — a definite plus for medical legal purposes!

Safe traction splinting is a science based on a comprehensive understanding of human anatomy and physiology. Sager Emergency Traction Splints are the embodiment of this science. They are constantly evolving in an attempt to bring the latest scientific advancements to the field of traction splinting. Each unique feature not only represents an increase to the comfort and safety of patients, but an advantage to the application of traction by First Responders. In the ever changing world of medical science, one thing remains constant — Sager Emergency Traction Splints are the most advanced lower limb traction device... ever!

Cadaver Study: Comparison Between Sager Emergency Traction Splints And Ischial Pad Traction Splints.

Abstract:

A traction and alignment comparison between the Sager Emergency Traction Splint and the Hare Traction Splint was made on a Cadaver with an exposed Intertrochanteric Femur fracture. Malalignment was observed when the Hare Traction Splint was applied. Acceptable alignment occurred with application of a Sager Emergency Traction Splint.

Sager Emergency Traction Splints' provide countertraction against the Ischial Tuberosity medial to the Shaft of the Femur — whereas Hare Traction Splints provided countertraction against the Ischial Tuberosity below the Shaft of the Femur. Pressure up against the Femur with the Hare mechanism creates pressure and possible injury on the Sciatic Nerve and other intervening soft tissue structures. This does not occur with Sager Emergency Traction Splints.

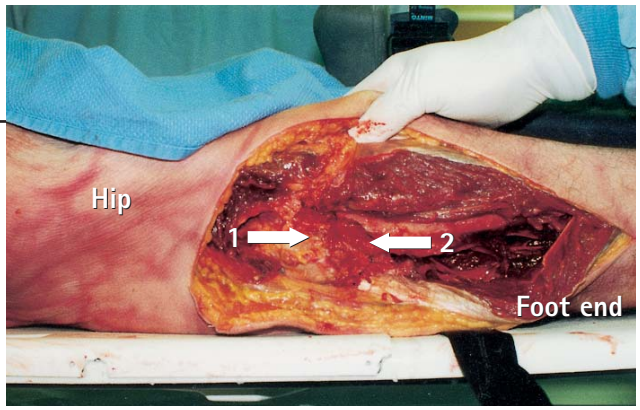


fig 8

Intertrochanteric Femoral Fracture with Sager Emergency Traction Splint in place with 15 lbs. of traction. Note alignment of fracture occurs and pressure on critical structures below the Femoral Shaft is absent.

1. Proximal Femur Greater Trochanter
2. Distal Femoral Shaft.

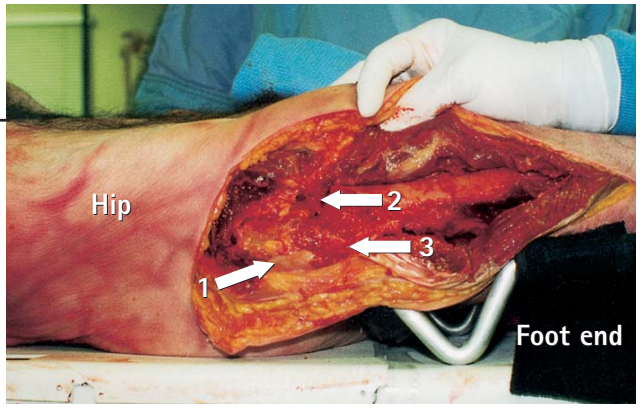


fig 9

Intertrochanteric Femoral Fracture with Hare Traction Splint in place with rope, 15 lbs. weight and pulley for traction. Note Femur is pushed up into malalignment and Sciatic Nerve and Vascular structures are pushed up into fracture site.

1. Proximal Femoral Fragment externally rotated
2. Distal Femoral Shaft
3. Approximate site of Sciatic Nerve.

A complete copy of the preliminary report;

"Cadaver Study; Comparison between Sager Emergency Traction Splints and Ischial Pad Traction Splints" is available on request.

Reprinted with permission from A.G. Borschneck, M.D.

Load Cell Study: Forces Acting On An Intact Femur With Hare Traction Splint and Sager Emergency Traction Splint.

Abstract:

A Load Cell Study documenting forces acting on the Proximal Femur in real time was made comparing Sager Emergency Traction Splints with the Hare Traction Splint. Range of force acting on the Femur with Sager Traction Splints was 0 - 2 lbs. Forces acting on the Femur using a Hare Traction device varied from 12 - 71 lbs.

Splint	Traction	Force Acting On Femur
Hare Splint on a supine patient —no thigh strap applied.	No traction	Varies 5.1 to 25 lbs.
Hare Splint on supine patient — thigh strap applied.	No traction	Varies 6.8 to 27.7 lbs.
Hare Splint on supine patient — thigh strap applied.	15 lbs. traction	Varies 6.4 to 29.8 lbs.
Hare Splint on supine patient — thigh strap applied. Patient moved to a Semi-Fowler's position.	15 lbs. traction	Varies 8.8 to 48 lbs.
Hare Splint on supine patient — thigh strap applied. Patient moved to a sitting position.	15 lbs. traction	Varies 20.0 to 71.0 lbs.
Hare Splint on supine patient — thigh strap applied. Patient lifted and carried.	15 lbs. traction	Varies 3.1 to 34.9 lbs.
Hare Splint on supine patient — thigh strap applied. Patient moved to three quarter prone position.	15 lbs. traction	Varies 5.0 to 27 lbs.

A complete copy of the preliminary report "Load Cell Study; Forces acting on an intact Femur with Hare Traction Splint and Sager Emergency Traction Splint" is available on request. Reprinted with permission from A.G. Borschneck, M.D.

Load Cell Study using a Sager Splint shows a maximum force of 1.2 lbs. acting on the femur with the patient in any position.

Cat Scan Study: The Ischial Tuberosity protrudes at most 1-2 cm. below the level of the shaft of the Femur. Reprinted with permission from A.G. Borschneck, M.D.

fig 10

Survey Radiograph of CAT SCAN Study through Pelvis and upper Thigh of adult male.

Note male Genitalia is not interposed between Sager's Ischial Perineal Cushion (splint cushion) and the Ischial Tuberosity.

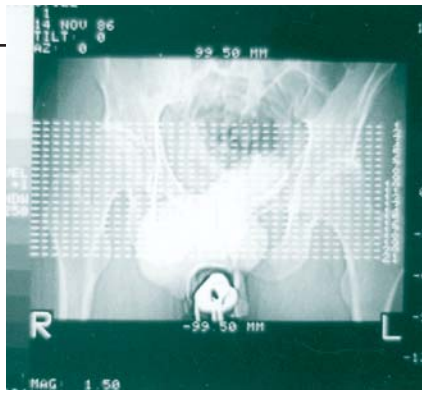


fig 11

Cross Section Cut #21 of CAT SCAN Survey of adult male.

Note Ischial Tuberosity is a structure medial to the Shaft of the Femur and protrudes at most 1-2 cm. below the level of the Shaft of the Femur.

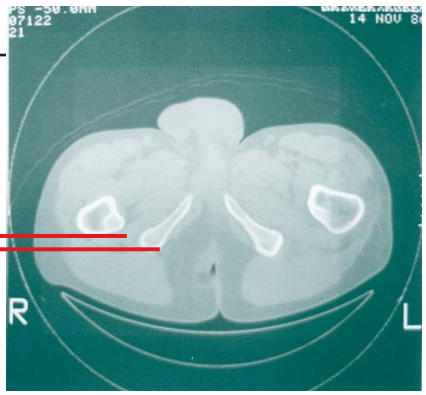


fig 12

Survey Radiograph of adult female CAT SCAN Study of the Pelvis and Femur.

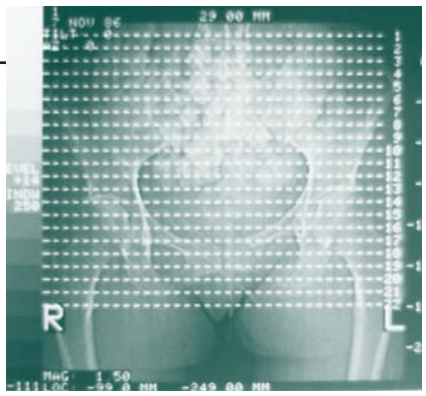
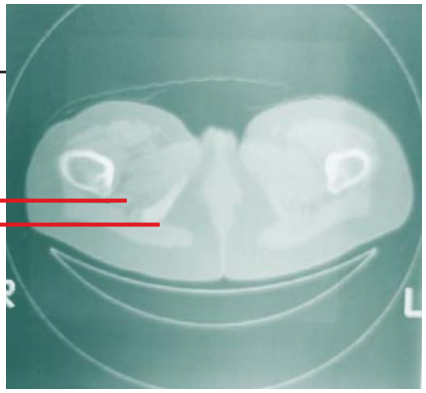


fig 13

Cross Section through Cut #21 of CAT SCAN Study.

Note Ischial Tuberosity is a medial structure in relation to the Shaft of the Femur. The Ischial Tuberosity protrudes at most 1-2 cm. below the Shaft of the Femur.



Section Three:
Mechanism of action

When a patient suffers a fractured Femur, the large muscles surrounding the bone react by going into spasm and thereby splint the fracture site. The pain alerts the patient to the injury and also prevents further movement of the limb which may worsen the injury.

Quantifiable, Dynamic Traction™ The Spring within the Inner Shaft of a Sager splint is dynamic. It continuously reacts to changes in the amount of muscle spasm.

The amount of pain felt by the patient is in part related to the amount of muscle in spasm as well as the degree of spasm. This is why a fractured Femur typically results in much more pain than a fractured Humerus.

The application of traction upon the muscle tires it and pulls it out of spasm and consequently relieves much of the patient's pain. It also restores the cylindrical shape of the leg and in the process increases tissue pressure within the thigh which inhibits further blood loss. It is interesting to note that blood loss of 1000 – 1500 c.c. is not uncommon with Femoral fractures.

The type of traction applied when using Sager Emergency Traction Splints is called "Quantifiable, Dynamic Traction™". "Quantifiable" means that the amount of traction applied is measurable in pounds or kilograms. "Dynamic" means that the amount of traction or "pull" on the fracture site is automatically adjusted in relation to the degree of muscle spasm. Thus, a correct and safe amount of traction is always achieved.

The Spring within the Inner Shaft of a Sager splint is dynamic. It continuously reacts to changes in the amount of muscle spasm. For example, if someone accidentally jostles a stretcher on which a patient is lying, the muscles around the fracture site may go into a more intense spasm and therefore produce more discomfort for the patient. The situation would also produce an increase in the amount of traction — perhaps even to the point of 30 pounds (the amount could be determined from the reading the traction scale). The subsequent increase in traction would quickly act to relieve the increase in muscle spasm.

Another and more common experience is that as the initial amount of traction acts upon the muscle spasm, the spasm reduces in intensity. You should notice a concomitant DECREASE in the amount of traction registered on the traction scale. This is both normal and desirable, as it acts as a safety mechanism to prevent unnecessarily high amounts of traction being applied. It indicates that the muscle spasm (and patient discomfort) are being reduced.

fig 14

Close-up of traction being applied to a patient.

Summary

Sager Emergency Traction Splints provide the best mode of traction for field use on fractured Femurs. They provide "safe traction" via their specially calibrated stainless steel spring. Sager Splint's also indicate the exact amount of traction force applied and have a dynamic feature that safely varies with the amount of muscle spasm.

fig 15

Sager Traction Wheel (Model S300 & S301)
Close-up of Sager Traction
(Pulley) Wheel and Scale.

fig 16

Close-up of Sager Traction Handle and Scale.
(Model S304)

fig 17

Paramedic applying Sager S301 Super
Sager Form III Single, on a 5'9" adult male.

fig 18

Close up of Model S304 Super Sager Form
III Bilateral demonstrates the Sager's unique
ability to fit inside air transport units.
If the patient fits — the Sager fits!

All Sager Traction Scales display traction in pounds and kilograms!

Section Four:

Features, advantage and benefits

Will fit patients ranging from a 4 year old to an adult well over 2 m (7 feet) in height. With the Sager's unique design the patient's weight is not a problem in application. For infants, model S300 Sager Infant Bilateral is available.

Feature	Advantage	Benefit
Quantifiable, Dynamic, Traction™	Designed to continuously show the exact amount of safe, quantifiable traction applied — with no possibility of overtraction. Permits documentation of the traction force applied — a plus for medical and legal purposes! The dynamic function permits the traction to decrease automatically and appropriately as the spasm releases.	Reduces further trauma and pain. • Increased patient comfort. • Safe Paramedic use. Continuous overtraction never occurs. Traction is variable — as the spasm decreases, traction decreases. Patients always have the right amount of safe traction.
Universal; one size fits all (5th to 99th percentile — models S304, and S301)	Fits an adult or child. No delay in application while searching for the right sized splint.	One (1) bilateral Sager Splint has four (4) times the potential of other splints.
Straight In-line Traction	Anatomically and physiologically proven to ensure superior alignment — no fear of malalignment!	Promotes rapid recovery with fewer complications. • No pressure against the Sciatic Nerve.
Articulating Base & Cushion™	Bends laterally for seating and exacting conformance to the Ischial Tuberosity.	Increases the comfort and safety of the patient. Traction never slips — no matter what patient position is assumed. Compared to other splints — provides the least amount of pain or movement when applying the splint.
Containment within the Body Silhouette™ (models S304, S204)	Does not extend beyond the feet of an adult. Ideal for use in enclosed areas.	No problem closing ambulance doors or transporting patients in stokes baskets. If the patient fits, the Sager fits!
Rapid One Person Application	Frees second attendant for other patients or procedures. Does not require constant monitoring.	Less patient manipulation and therefore less pain and discomfort. More time for patient evaluation and care.
Applied in any position	Can be applied prior to moving patients from dangerous locations.	Promotes increased patient stability. Less pain, less possibility of further injury.
Compact and Lightweight	Weighs 3½ pounds. Will fit in most backpacks.	Ready for use.

Model	Advantage	Benefit
S304 Super Sager Form III Bilateral 	■ Has the ability to treat an adult or child, with one (1) or two (2) fractured Femurs. ■ Universal; has four (4) times the function of Ischial Pad Splints.	■ You always have the correct splint to treat the wide variety of Femoral fractures.
S301 Super Sager Form III Single 	■ Economical. ■ Treats unilateral fractures on an adult or child.	■ Quick application. ■ Less equipment to carry.
S300 Super Sager Infant Bilateral 	■ Only splint on the world market that is designed to treat children from birth to six (6) years of age. ■ No risk of overtraction and its detrimental effects to Epiphyseal growth centers, Knee Edema, and excessive distraction of bone ends. ■ 1996 Guidelines for Pediatric Equipment and Supplies deemed pediatric extremity splints as essential for all BLS and ALS Ambulance units[1].	■ Pediatric patients receive the same care as an adult — the correct equipment sized for a child.

[1] *Annals of Emergency Medicine, Dec. 1996, No. 28, p. 699-701*

Other model combinations

Super Sager Form III Combo Pac #1 (Model S300-1)
1 x S300 Infant Bilateral and 1 x S301 Form III Single.
Both units store in a single carry case.

Super Sager Form III Combo Pac #2 (Model S300-4)
1 x S300 Infant Bilateral and 1 x S304 Form III Bilateral.
Both units store in a single carry case.

Model S300 Super Sager Infant Bilateral,
Model S301 Super Sager Form III Single,
Model S304 Super Sager Form III Bilateral.

Super Sager Combo Pacs are:
Great value. Low Price. Ideal for Training Institutes.
Contact your Authorized Sager Distributor for details.

Section Five:

Sager components

The splint proper is manufactured from 303 stainless steel. Sager Form III Series Articulating Base is comprised of Dupont's Crastin Polyester Resin. The Form III Shaft Cushion is manufactured from Closed Cell CPE (Chlorinated Polyethylene) Foam. The S300's outer shaft is encased in a vinyl form fitting cover.

All Sager Splints come complete with all components and accessories required for use, including;

Sager Emergency Traction Splints have six (6) basic components. These consist of;

- The Carrying Case
- The Abductor Bridle (Thigh Strap)
- The Splint Proper
- The Leg Cravat Kit
- The Pedal Pinion (Figure Eight (8) Strap)
- The Malleolar Harness Set (Ankle Harnesses)

Carrying Case

The Carrying Case has been designed to provide easy access and storage of all Sager components and accessories. The Super Sager Form III Combo Pac Carry Case has been designed to store both Adult/Child & Infant Sager models all in one convenient case!

Model S304, Super Sager Form III Bilateral Components.

Splint Proper

The Splint Proper consists of the Ischial Perineal Cushion and Saddle Base (Articulating base & cushion), the Outer and Inner Telescoping Shafts, the Cross Bar Harness, Traction Scale and Traction Handle or Traction (Pulley) Wheel.

The Form III Articulating Base and Cushion enables anatomically and physiologically correct countertraction to be applied against the bony structures of the Pelvis. These structures include the Ischial Tuberosity, Ischial Ramus, Pubic Ramus, Pubic Symphysis and Mons Pubis. These hard points ensure fail safe countertraction – no matter what the patient's position may be! The Articulating Base and Cushion bends laterally for seating and exacting conformance to the Ischial Tuberosity. It is interesting to note that Sager's Ischial Perineal Cushion provides the same safe and secure mode of support as a bicycle seat.

continued overleaf...

Articulating Base and Cushion

The Outer and Inner Shafts act as the splint and also contain the traction mechanism. The Shaft Cushion, which covers the length of the outer shaft, provides added comfort and cushioning. The outer shaft includes a Button Latch at the distal end that acts as a one-way lock.The splint may be lengthened and locked by simply pulling on the Inner Shaft. In order to decrease the splint's length, the Button Latch must be lifted to allow retraction of the Inner Shaft, thus shortening the splint's length. The Cross Bar provides the point of attachment for the Ankle Harnesses, and the Traction Handle/Wheel provides controlled safe, secure, quantifiable, dynamic traction to the injured limb(s). Sager's Traction Scale displays the amount of traction that has been applied — enabling the Operator to document the exact amount of traction applied. **It should be noted that constant traction fatigues leg muscles in spasm — allowing the reduction of bone overlap to ensure leg lengthening and alignment.**

Probe lens view of the Outer and Inner Shaft(s) of Sager model S304.

Abductor Bridle

The Abductor Bridle (thigh strap) is used to bend and hold the Ischial Perineal Cushion laterally for seating and exacting conformance to the Ischial Tuberosity.

Malleolar Harness

The Malleolar (Ankle) Harness is designed to attach around the patient's Ankle above the medial and lateral Malleoli. The harnesses are marked "Left" and "Right" to indicate the appropriate placement and use. Each harness has Comfort Cushions that can be folded into place to accommodate the various sizes of Ankles or leg wear.

Leg Cravat Kit

Sager's Leg Cravat Kit consists of three (3) elasticized straps. These straps have been specially designed to spread equal tension when applied over the entire surface area. The largest strap will be placed around the patient's upper Thigh. Do not be concerned about applying this strap over a fracture site. Once traction has been applied, the Bone ends will be drawn into near normal alignment and natural splinting takes place. The strap provides further splinting in conjunction with the splint shaft and the patient's other leg. The remaining straps will be applied around the patient's knees and around the patient's shins just above the ankle harnesses.

Pedal Pinion

The Pedal Pinion (figure eight (8) strap) is applied around the Ankles and Feet to prevent internal or external rotation of the distal parts of the fractured Bone. It also provides additional splinting.

Note as with any device that uses hook and loop fasteners, the Cravats may engage on carpet unless care is taken during application. When you insert the Cravats under the knee, the HOOK half of the Velcro fastener faces UP on the end of the Cravat being inserted. The LOOP half of the Velcro fastener, therefore will trail and face DOWN and will not stick to the carpet.

Section Six:
Questions and answers

Q&A

1 What advantage is there to using Sager's revolutionary Malleolar (Ankle) Harness?

- There is less chance of cutting off circulation with the Sager Malleolar Harness (ankle harness) because it is applied above the Malleoli of the ankle away from the posterior Tibial and Dorsalis Pedis Arteries. These arteries are deep in the ankle at the site of application of the Sager Malleolar Harness.
- The Sager Malleolar Harness is quick and easy to apply.
- The Sager Malleolar Harness is now copied and used by almost all splint manufacturers.
- The traditional triple and quadruple type harnesses used with Ischial Pad Traction Splints are applied lower over the foot — directly over the Dorsalis Pedis and posterior Tibial Arteries at the location in the foot where they are most superficial and most susceptible to pressure or injuries.

fig 19

Cross section of the ankle above the Malleoli at the site of pressure and traction of the Sager Malleolar Harness. Note that the arteries are protected from compression at the Malleoli of the Ankle.

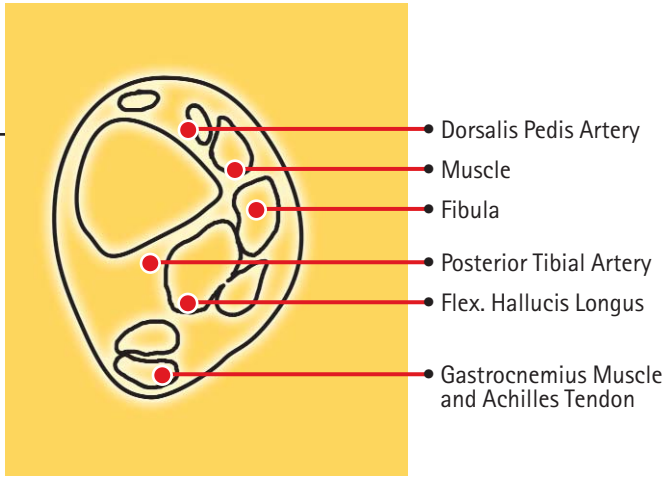
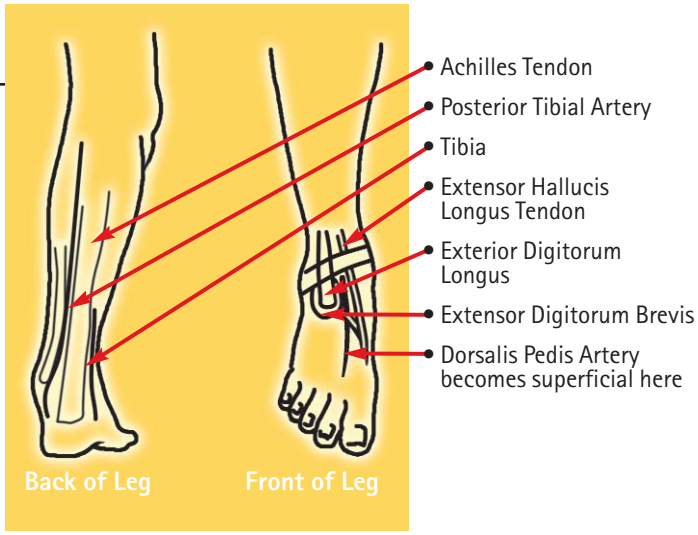


fig 20

Diagram of lower limb. Anterior and Posterior view of the lower limb at the site of the Sager Malleolar Harness. Note that at the front of the leg the Dorsalis Pedis Artery is located deep in the anterior Ankle and is protected from compression except on the top of the foot. At the back of the leg the posterior Tibial Artery is protected from compression because it is located between the Fibula and Achilles Tendon.



2 Is there a danger that external rotation of the fractured femur can occur using a Sager Splint?

- **No**, not when the Sager Splint is properly applied and the Pedal Pinion (figure 8 strap) is used to bind the feet together. External rotation of a fractured femur can and does happen using Ischial Pad Traction Splints that have the foot end raised on a tri-pod – where the feet cannot be bound together.

With Ischial Pad Splints – One cannot bind the feet together unless the good leg is raised also!

3 Is elevation of the foot much better for prevention of leg congestion and swelling?

Any elevation of the injury and the limb distal to it can be helpful – **but look at the facts:**

- Most Ischial Pad Traction Splints in use today elevate the foot seven (7) inches. The hip may not be elevated at all – or at most – be elevated one (1) to two (2) inches.
- If the foot is the injured part, there may be some improvement in drainage and a decrease in congestion and swelling **of that foot**. However, this does nothing for the drainage of the injured femur.
- In order to take advantage of elevation, one would have to raise the foot (ankle) approximately twenty-two (22) inches in order to raise the femoral injury above the level of the heart. **However, even this extreme elevation will not raise the injury above the level of the patient's heart when the fracture is at the proximal end of the femur.**
- Ischial Pad Traction Splints cannot raise femurs above the level of the heart therefore; this minimal elevation is of no value. It can also be detrimental.
- If elevation of the fracture site is desired, trendellenberg positioning of the patient should be considered. This is the only method to truly elevate the femur above the level of the patient's heart.

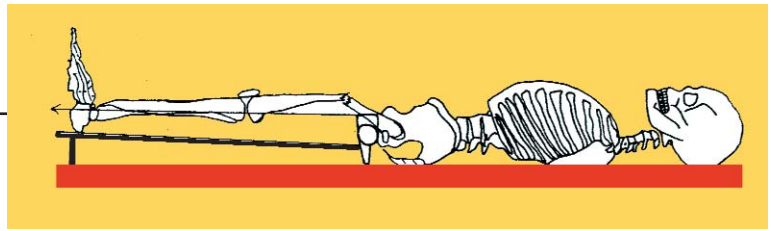


fig 21

This minimal elevation is of no value.

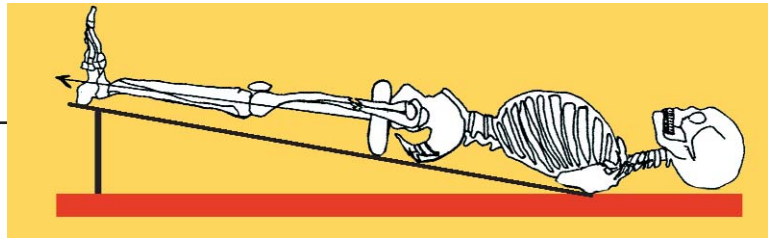


fig 22

If elevation of the fracture site is desired, Trendellenberg positioning of the patient is the more appropriate course of action.

4 Are Sager Splints contraindicated in the case of massive fractures of the pelvis?

- **Yes**, but so are all traction splints – including Ischial Pad Traction Splints since they also can compress and deform the Ischial Tuberosity which is part of the pelvis and subject to movement.

5 Why should I purchase a Sager Splint when some hospitals in my area utilize Ischial Pad Traction Splints and can exchange splint for splint?

Sager Splints are the most advanced anatomical and medically engineered splints sold on the world market today. **Remember:**

- The Sager Splint is the only splint that provides bilateral splinting capabilities and quantifiable dynamic traction. One splint can treat either an adult or child with one or two fractured femurs. Ischial Pad Traction Splints require the purchase of four splints to have the range of use of one Sager Splint. Moreover, you will always know how much traction you have applied!
- Solution! Have your hospital join the increasing number of progressive hospitals nationwide who use Sager Splints exclusively for in-hospital and service exchange use!

Ischial Pad and Half Ring Splints require the purchase of four splints to have the range of use of one Bilateral Sager Splint.

6 Are Sager Emergency Traction Splints comfortable to wear? Do they press against male and female genitalia?

To date, no significant complaint of discomfort due to pressure from the Perineal Cushion has been recorded. When patients do complain, there has always been some aspect of the application technique of the splint that has been overlooked. **Remember:**

- Trials using a Sager Splint in practice situations should be undertaken with the "patient" wearing loose shorts and jeans so that natural genital mobility can take place. This is important for both male and female trainees/candidates.
- In real life situations, clothing of course, should be opened, cut, and/or removed as part of the evaluation process of the patient.
- The Ischial Perineal Cushion should be placed snugly in the lateral perineal area against the thigh and the Ischial Tuberosity and then strapped into place before applying traction.

fig 23

Few people, male or female, complain about discomfort when sitting or riding on a bicycle. The structures used and pressed on in this situation are the same as those used when wearing a Sager Splint.

7 What advantage is there to using a Sager Splint with Anti-Shock Trousers?

Sager Splints are so versatile that Anti-Shock Trousers can be applied over the leg of a patient wearing a Sager Splint just as easily – probably easier – than on a patient not wearing a splint at all. After the Sager is applied, the patient's fractured femur is stabilized, and it becomes easy to clothe a patient in an Anti-Shock garment. **Remember:**

- The shaft of the splint is closely applied to the medial side of the thigh and the Ischial Perineal Cushion is located so that it lies in the perineal opening of the Anti-Shock garment.
- Since the splint is closely applied to the leg, there is excellent contouring of the pressure bladder of the trouser around the shaft of the splint and over the leg. The possibility of tenting between the shock trouser and the splint shaft is so small that it becomes negligible.
- Ischial Pad Traction Splints are irregular in shape and poorly conform to the shape of a patient's leg when Anti Shock trousers are applied.

fig 24

Sager Splints mate perfectly with Anti-Shock Trousers – inside and out!

fig 25

If the patient fits – the Sager Fits (Models S304 and S204).

8 Sager Splints provide medial and lateral splinting and traction as well as prevention of internal and external rotation. Is this less desirable than posterior splinting?

No, not at all. One might consider posterior splinting as most desirable if one was transporting a patient without the use of a basket, spine board, and/or stretcher. This never happens, so why provide posterior support on a device that requires posterior support to be effective? **Remember:**

- Ischial Pad Traction Splints must have a firm support beneath them in order to work and not slip off the Ischial Tuberosity. Example: It is difficult to apply these devices in snow.
- Time motion studies clearly reveal; an economy of time, decrease of unnecessary steps, decreased movement of the patient, and, a decrease in morbidity moving the patient from the place of injury to the hospital when a Sager Splint is used.
- Immobilization is better using a Sager Splint if the patient has a proximal fracture of the femur – which is the most common type of femoral fracture.
- Sager's splinting system works well with a Spine-board or stretcher.
- Sager Splints also work well with Minto Breakaway Flats. Minto Breakaway Flats have been uniquely designed to complement the wide range of patient sizes – including over-sized patients.

9 Will the elasticized Leg Cravats (straps) used with Sager Splints be harmful if applied directly over the fracture site?

No. The limb is immobilized by traction helping to bring the fractured bones into alignment. The three elasticized straps splint the leg – further immobilizing it and at the same time help to decrease the blood loss at the fracture site.

10 Sager Splints provide dynamic traction in pounds and kilograms. What happens if the calibrated sping breaks?

In over twenty-five (25) years of use there has never been an instance of the spring breaking.

Ask Your Authorized Sager Distributor about these additional Minto Products.

Sized and Shaped For Today's EMS Needs

Minto Breakaway Flats provide the perfect solution to inter-hospital and intra-hospital transport. They feature a pull-out Center Strap that allows the flat to break into two (2) pieces. The flat can then be easily removed from underneath the patients' sides – without moving the patient! The hinged frame assembly allows for tilting the flat into a Semi-Fowler's position (head elevated) for ease in patient care. The same feature enables convenient carrying and storage of flats.

Crews no longer have to waste time waiting to retrieve their transport system. The flat's unique design enables crews to retrieve the flat immediately after patient transfer. Think of them as the patient transfer system you won't leave behind!

Minto Breakaway Flats have been in use throughout North America since 1985. They are available in two (2) distinct sizes and shapes, and have been designed to meet the needs of today's Emergency Medical Services.

- Model B101, Standard Flat – Sets the standard of quality patient care for adults and everyday use
- Model B104, Maxi Flat – Constructed from extra heavy duty materials to support the oversized patient

Without a doubt, there's a Minto BREAKaway Flat to meet your needs!

fig 26

Minto Breakaway Flat model B101, (Standard Flat).

fig 27

Minto Breakaway Flat model B104, (Maxi Flat). Constructed from extra heavy duty materials for the oversized patient. Weight capacity of 1,000 pounds when lifted equally on all sides.

Section **Seven**:
Contraindications and cleaning

All operators should receive full and proper initial and refresher instruction sessions from a qualified person on detailed use of this equipment and regarding the particular situations in which it should be used.

Indications: Sager splints are indicated for use on Proximal Third and Mid-Shaft femoral fractures.

Contraindications for the use of tractions splints for femoral fractures.

A fracture of the Pelvis occurring with a fracture of the Femur is generally a contraindication for the use of a traction splint of any type. **A Sager Emergency Traction Splint is not contraindicated when MAST Trousers are used to immobilize the fractured Pelvis.** In this situation, Sager Splints may be applied over MAST Trousers if treatment of the fractured Femur is indicated or desired. Sager's traction is quantifiable and gentle and will not disrupt or move Pelvic bones immobilized by MAST Trousers.

Supracondylar fractures of the distal end of the Femur are contraindicated because traction can cause anterior rotation of the distal bone fragment – forcing the sharp fractured bone end down into the Popliteal Artery and Nerve. These fractures should be splinted as found.

Compound fractures of the Femur with bone fragments sticking through the skin may be a contraindication. Guidelines by local protocol or instructions by a Medical Consultant should be followed.

Fractures of the Ankle and Foot are also contraindicated. Pressure from the ankle harness and from traction is not therapeutic.

The indications and contraindications listed above are only intended as a basic reference tool. Please defer to federal, state, and/or local protocol for definitive analysis and guidelines.

Warning: All Operators should receive full and proper initial and refresher instruction sessions from a qualified person on detailed use of this equipment and regarding the particular situations in which it should be used.

Cleaning Instructions:

Software Goods and Stainless Steel: "Manu-Klenz"[1] (i.e.: Sodium Dodecylbenzine Sulfonate and Coconut Diethylthanolamide). Effective manual washing of heavily soiled washable surfaces, medical instruments, counters, glass and plastic surfaces.

Directions: 1 ounce Manu-Klenz to 1 gallon water.

Stainless Steel: 70% Alcohol solution or above instructions.

Foam Rubber: "Precise"[2] Hospital Foam Cleanser/Disinfectant.
1, 2 or other comparable product.

Appendix A.

Practical examination for use by Sager Emergency Traction Splints students. Includes test paper, student exercises and a certificate for successful candidates.

Practical Examination

Sager Emergency Traction Splints

Name: _____

Student i.d. #: _____

Date: _____

Course: _____

Questions 1 – 25, 2 points each.

1 If elevation of a femur fracture is desired, the only method to truly elevate the femur above the level of the heart is:

- ☐ Use an ischial pad traction splint with tripod.
- ☐ Trendellenberg positioning of the patient.
- ☐ Position patient on spine board with head elevated.
- ☐ Place patient in side position with fracture site up.

2 What is the best method of preventing external rotation of a fractured femur?

- ☐ Apply an ischial pad splint with tripod which binds the foot of the injured limb.
- ☐ Bind the feet together on the transport stretcher.
- ☐ Properly apply a Sager Splint which utilizes a Pedal Pinion (figure 8) strap to bind the feet together.
- ☐ Immobilize patient on Ked board.

3 Sager Emergency Traction Splints feature "Quantifiable, Dynamic Traction™". Among other things, this feature enables first responders to:

- ☐ Measure traction in pounds or kilograms.
- ☐ Document the traction force applied.
- ☐ Reduce the risk of continuous overtraction.
- ☐ All of the above.

4 You have a 6′6″ tall patient with a fractured femur needing transport in a Stokes basket. Which of the following features and benefits are most critical to the patient? Choose only one.

- ☐ A revolutionary manual ratchet traction mechanism.
- ☐ Straight in-line traction.
- ☐ Quantifiable, Dynamic Traction™ (traction handle and scale).
- ☐ A handy tripod.
- ☐ Both unilateral and bilateral splinting capabilities.
- ☐ Exclusive unilateral splinting capabilities only.
- ☐ Articulating Base and Cushion.
- ☐ Containment within the body silhouette™

5 The advantages and benefits of a single rescuer being able to apply a Sager Splint are:

- ☐ Frees second attendant for other patients and procedures.
- ☐ Less patient manipulation and therefore less pain and discomfort.
- ☐ More time for patient evaluation and care.
- ☐ Does not require constant monitoring and adjustments.
- ☐ All of the above.

6 When a Sager Splint is properly applied, the structures used and pressed on are the same as those:

- ☐ Used and pressed on when riding a stationary bicycle.
- ☐ Used and pressed on when riding a unicycle.
- ☐ Used and pressed on when riding a mountain bike.
- ☐ Used and pressed on when straddling a fence.
- ☐ All of the above.

7 The purpose of elasticized Leg Cravats is to:

- ☐ Splint the leg.
- ☐ Further immobilize the leg.
- ☐ Help decrease the blood loss at the fracture site.
- ☐ All of the above.

8 The traditional ankle harnesses used with ischial pad splints are applied:

- ☐ Above the Malleoli of the ankle, away from the Posterior Tibial and Dorsalis Pedis arteries.
- ☐ Directly over the Dorsalis Pedis and Posterior arteries.
- ☐ Over the Posterior Tibial, but not over the Dorsalis Pedis artery.

9 In the case of massive fractures of the pelvis, which type of traction splints are contraindicated?

- ☐ Sager Emergency Traction Splints
- ☐ Hare Traction Splints
- ☐ Donway Traction Splints.
- ☐ Ferno Traction Splints.
- ☐ Reel Traction Splints.
- ☐ All of the above.

10 The Ischial Tuberosity is a structure that is _____ to the shaft of the femur.

- ☐ Superior
- ☐ Inferior
- ☐ Medial
- ☐ Lateral

11 Cat Scan studies reveal that the Ischial Tuberosity protrudes a maximum of _____ cms. below the level of the shaft of the femur.

- ☐ 10 - 12 cm.
- ☐ 6 - 8 cm.
- ☐ 4 - 6 cm.
- ☐ 1 - 2 cm.

12 In the intact human limb a positive tissue pressure is established because the Fascia (muscle sheath) forms a _____ which maintains its shape due to the internal support of the femoral bone.

- ☐ Circle.
- ☐ Cylinder.
- ☐ Ellipse.

13 The most important action of applying traction to a fractured femur in a patient who is hypovolemic and/or is developing shock from multiple injuries is:

- ☐ Align the fragments.
- ☐ Pain relief.
- ☐ Prevent damage to nerve and vascular structures
- ☐ Minimize blood loss.

14 The various modes for traction can be divided into three broad groups. Which is the safest for prehospital care?

- ☐ Continuous traction (weight and pulley).
- ☐ Static traction (drum and crank).
- ☐ Dynamic traction (spring traction).

15 Manual traction by a first responder or paramedic falls in the category of dynamic traction. It has one serious drawback as well as one serious limitation. These are:

- a. ☐ The drawback of unknown traction.
- b. ☐ The limitation of human endurance.
- c. ☐ Increased force with time.
- d. ☐ Over-extension occurs.
- e. ☐ Forces decrease with time.
- ☐ C and D
- ☐ A and B
- ☐ A and E
- ☐ A and D

16 The Sager Form III Articulating Base and Cushion functions in the same manner as a:

- ☐ Hare Splint.
- ☐ Reel Splint
- ☐ Thomas Full Ring or true Half Ring
- ☐ All of the above.

17 The Sager Form III Articulating Base and Cushion bends laterally for seating and exacting conformance to the:

- ☐ Inner thigh.
- ☐ Ischial Tuberosity.
- ☐ Symphysis Pubis
- ☐ Groin.

18 The American Academy of Orthopedic Surgeons recommends gentle traction for a fractured femur on an adult patient which is:

- ☐ 15 pounds per leg.
- ☐ 30 pounds per leg.
- ☐ 15 kilograms per leg.
- ☐ You pull traction until the patient gets relief.

19 Sager's dynamic function enables the traction to _____ as the spasm releases.

- ☐ Maintain.
- ☐ Decrease.
- ☐ Increase.

20 The Sager Form III series splints will fit a patient ranging in age from a _____:

- ☐ A 6 year old to an adult over 7 feet in height.
- ☐ A 3 year old to an adult over 7 feet in height.
- ☐ A 4 year old to an adult over 6 feet in height.
- ☐ A 4 year old to an adult over 7 feet in height.

21 Sager traction splints are indicated for _____ percent of femoral fractures.

- ☐ 100
- ☐ 75
- ☐ 93
- ☐ 9

22 Ischial Pad traction splints are indicated for _____ percent of femoral fractures.

- ☐ 75
- ☐ 93
- ☐ about 78
- ☐ About 9

23 Bleeding to some degree is a common problem with fractured femurs. The average amount of blood loss is:

- ☐ 1000 c.c.
- ☐ 1500 c.c.
- ☐ 3000 c.c.
- ☐ 1500 – 3000 c.c.

24 The amount of pain felt by a patient with a fractured femur is in part related to the amount of: _____.

- ☐ Amount of blood loss.
- ☐ Degree of Angulation.
- ☐ Anesthesia of the part.
- ☐ Amount of spasm.

24 The Sager S300 Infant Bilateral splint has been designed to reduce the risk of _____.

- ☐ Overtraction.
- ☐ Knee edema.
- ☐ Injury to Epiphyseal growth centers.
- ☐ All of the above.

Practical examination : Answer key

Sager Emergency Traction Splints

1 If elevation of the femur fracture is desired, the only method to truly elevate the femur above the level of the heart is: **Trendellenberg positioning of the patient.**

2 What is the best method of preventing external rotation of a fractured femur? **Properly apply a Sager Splint which utilizes a Pedal Pinion (figure 8) strap to bind the feet together.**

3 Sager Emergency Traction Splints feature "Quantifiable, Dynamic Traction™". Among other things, this feature enables first responders to: **All of the above.**

4 You have a 6'6" tall patient with a fractured femur needing transport in a Stokes basket. Which of the following features and benefits are most critical to the patient? Choose only one. **Containment within the body silhouette™.**

5 The advantages and benefits of a single rescuer being able to apply a Sager Splint are: **All of the above.**

6 When a Sager Splint is properly applied, the structures used and pressed on are the same as those: **All of the above.**

7 The purpose of elasticized Leg Cravats is to: **All of the above.**

8 The traditional ankle harnesses used with ischial pad splints are applied: **Directly over the Dorsalis Pedis and Posterior arteries.**

9 In the case of massive fractures of the pelvis, which type of traction splints are contraindicated? **All of the above.**

10 The Ischial Tuberosity is a structure that is _____ to the shaft of the femur. **Medial.**

11 Cat Scan studies reveal that the Ischial Tuberosity protrudes a maximum of _____ cms. below the level of the shaft of the femur. **1–2 cms.**

12 In the intact human limb a positive tissue pressure is established because the Fascia (muscle sheath) forms a _____ which maintains its shape due to the internal support of the femoral bone. **Cylinder.**

13 The most important action of applying traction to a fractured femur in a patient who is hypovolemic and/or is developing shock from multiple injuries is: **Minimize blood loss.**

14 The various modes for traction can be divided into three broad groups. Which is the safest for prehospital care? **Dynamic traction (spring traction).**

15 Manual traction by a first responder or paramedic falls in the category of dynamic traction. It has one serious drawback as well as one serious limitation. These are: **(a) and (b).**

16 The Sager Form III Articulating Base and Cushion functions in the same manner as a: **Thomas Full Ring or true Half Ring.**

17 The Sager Form III Articulating Base and Cushion bends laterally for seating and exacting conformance to the: **Ischial Tuberosity.**

18 The American Academy of Orthopedic Surgeons recommends gentle traction for a fractured femur on an adult patient which is: **15 pounds per leg.**

19 Sager's dynamic function enables the traction to _____ as the spasm releases. **Decrease.**

20 The Sager Form III series splints will fit a patient ranging in age from a _____. **A 4 year old to an adult over 7 feet in height.**

21 Sager traction splints are indicated for _____ percent of femoral fractures. **93.**

22 Ischial Pad traction splints are indicated for _____ percent of femoral fractures: **About 9.**

23 Bleeding is a common problem with fractured femurs. The average amount of blood loss is: **1500 c.c.**

24 The amount of pain felt by a patient with a fractured femur is in part related to the amount of: **Amount of spasm.**

25 The Sager S300 Infant Bilateral Emergency Traction Splint has been designed to reduce the risk of: **All of the above.**

Student Exercise

Sager Emergency Traction Splints.

Parts identification. (place the correct number by the part)

1. Splint Proper.
2. Shaft Cushion.
3. Leg Cravat Kit.
4. Malleolar Harness Set.
5. Abductor Bridle.
6. Pedal Pinion.
7. Articulating Base and Cushion.
8. Carrying Case.
9. Traction Handle and Scale.

Student Exercise: Answer Key

Sager Emergency Traction Splints.

Parts identification.

1. Splint Proper.
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SAGER®
Emergency Traction Splints

Certification of completion

This certifies that: _____ has completed both practical and written examinations in the use of Sager Traction Splints and meets all local, state and federal requirements and certifications for use of this equipment.

Date awarded: _____ **State of:** _____

Awarded by: _____ *(EMS Instructor)*

On behalf of: _____ *(EMS Institution)*

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